

CHEM 5310: Advanced Organic Chemistry-II
Spring 2017

Instructor: Frank Foss

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Office Hours: Mondays and Wednesdays 4-5 PM

Section Information: CHEM 5310-001

Time and Place of Class Meetings: MWF 10:00-10:50, SH 315

Description of Course Content: Chemistry 5310 continues our investigation of the relationship between the molecular structure and reactivity of organic compounds. In particular, we will study advanced mechanisms, including: addition and elimination pathways, carbonyl reactions, aromatic substitution, free radicals, and photochemistry. Additional topics may be addressed.

Student Learning Outcomes:

1. Comfortably state the reactivity of compound classes, by functional group,
2. Rationalize mechanisms from empirical & theoretical kinetic and non-kinetic data,
3. Describe steric, electronic, and conformational effects of various mechanisms,
4. Differentiate and communicate the reactivity and selectivity of related reagents, &
5. Correctly predict the products that should arise from ionic, radical, and photochemical reactions.

Requirements: preparation, class participation, and on-time completion of homework is expected.

Required Textbook:

1. -Advanced Organic Chemistry: Part A, Fifth Edition, Francis A. Carey and Richard J. Sundberg (Free Online)
2. -Advanced Organic Chemistry: Part B, Fifth Edition by Francis A. Carey and Richard J. Sundberg
3. -Strategic Applications of Named Reactions in Organic Synthesis" by Kürti and Czakó

(See below for recommended reading and potential additions to your library.)

Assessment: Problem Sets ¹	20%
Midterm Exams ²	40% (2 x 20%)
Cumulative Final Exam ³	20%
In-Class Assignments/Participation ⁴	20%
	100%

¹Study sessions will be given before each exam to review problem sets and student questions.

²There will be no make up exams. If an exam is missed, the following policy³ will be employed.

³If you score better on your final than any midterm exam, your final grade will replace your lowest midterm exam (so-called "resurrection grading"). This policy will also replace zeros from missed exams.

⁴Attending class faithfully and completing all work is essential for this course. Credit will be awarded based on your participation in classroom assignments and your ability to offer **plausible** answers to mechanism questions.

Important Dates:

January 18 th	First day of class
February 1 st	Census Date
March 6th	EXAM 1
<i>Spring Vacation</i>	<i>March 13th-18th, No Class</i>
April 3 rd	Last day to drop
April 17th	EXAM 2
May 5 th	Last Day of Classes
May 8th	FINAL EXAMINATION – 8:00 - 10:30AM

TOPICS TO BE COVERED:

By Chapter:

Cary Sundberg Part A:

1. Polar Additions and Eliminations Reactions – Chapter 5
2. Carbanions and other Carbon Nucleophiles – Chapter 6
3. Carbonyl Reactions – Chapter 7
4. Aromatic Substitution – Chapter 9
5. Radical Reactions – Chapter 11
6. Photochemistry – Chapter 12

Additional Reading assignments are posted on Blackboard.

Cary Sundberg Part B:

1. Electrophilic addition to Alkenes – Chapter 4
2. Enolates and Other Nucleophiles – Chapter 1
3. Carbon Nucleophiles w/ Carbonyl Compounds – Chapter 2
4. Substitution Interconversion of Functional Groups – Chapter 3

Should time permit, we will discuss additional chapters. You should review the remaining mechanistic chapters of this text (Chapters 5, 7, & 9) if you plan on taking Organic Chemistry 3, CHEM 5312

Attendance Policy: Attendance is critical to attain full participation, part of your grade.

Academic Integrity: This class has a **ZERO TOLERANCE POLICY** for cheating and academic dishonesty. Any cheating or plagiarism will result in a failing grade for this class and referral to the Office of Student Conduct. All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Chemistry and Biochemistry Department Librarian: Antoinette Nelson email: nelsona@uta.edu

Suggested Resources for Organic Chemists (not necessary for this course):

By category:

Reactions/Mechanisms/Structural Theory

1. "Modern Physical Organic Chemistry" by Anslyn and Dougherty
2. "Advanced Organic Chemistry: Part B" Fifth Edition by Francis A. Carey and Richard J. Sundberg
3. "Frontier Orbitals and Organic Chemical Reactions" by Ian Fleming
4. "Pericyclic Reactions" by Ian Fleming
5. "Strategic Applications of Named Reactions in Organic Synthesis" by Kürti and Czako
6. "March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure" by Smith
7. "The Organometallic Chemistry of the Transition Metals" by Robert H. Crabtree

Synthetic Strategy

1. "Classics in Total Synthesis" by Nicolaou and Sorensen
2. "Organic Synthesis The Disconnection Approach" Warren and Wyatt
3. "Workbook for Organic Synthesis Strategy and Control" by Wyatt and Warren
4. Journals to Read: See below

Stereochemistry and Stereoselectivity

1. "Basic Organic Stereochemistry" by Eliel, Wilen, Doyle
2. "Stereochemical Effects" by Kirby
3. "Principles of Asymmetric Synthesis" by Gawley and Aubé
4. "Stereoselectivity in Organic Synthesis" by Proctor

Radical/Photochemical Reactions

1. "Modern Molecular Photochemistry" by Turro
2. "Radical Reactions in Organic Synthesis" by Zard

Synthetic Journals for Daily Reading:*

1. ACS Catalysis¹
2. Adv. Synth. Catal.¹
3. Angew. Chem. Int. Ed.,²
4. Chem. Commun.,²
5. Chem-Eur. J.,²
6. Chem. Sci.²
7. Eur. J. Org. Chem.,¹
8. Heterocycles¹
9. J. Am. Chem. Soc.,²
10. J. Chem. Ed.²
11. J. Org. Chem.,¹
12. J. Med. Chem.
13. Nat. Chem.²
14. Org. Biomol. Chem.,²
15. Org. Lett.,¹
16. Org. Process Res. Dev.,¹
17. Tetrahedron¹
18. Tetrahedron Lett.¹

* Some of these journals are specifically for synthesis,¹ others² are general in nature, but can showcase premier syntheses or critical information/examples. This list is, of course, incomplete.